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This is ERS...



- MARKETING ECONOMICS
- FOREIGN REGIONAL ANALYSIS
- FARM PRODUCTION ECONOMICS
- FOREIGN DEVELOPMENT AND TRADE
- ECONOMIC DEVELOPMENT
- ECONOMIC AND STATISTICAL ANALYSIS
- NATURAL RESOURCE ECONOMICS

CONTENTS

| | |
|-----------|--|
| 3 | Marketing Economics |
| 6 | Foreign Regional Analysis |
| 8 | Farm Production Economics |
| 11 | Foreign Development and Trade |
| 14 | Economic Development |
| 17 | Economic and Statistical Analysis |
| 20 | Natural Resource Economics |

This is ERS . . .

The ifs in American agriculture are many; this nation and many others are deeply concerned that the right decisions are made at the right times to supply a continuing abundance of food and fiber.

What would be the effect on farm income, on food supplies and costs, on costs of government programs, on foreign aid if farmers used more land and more fertilizer, if food marketers automated more, if other countries produced more?

Providing reasoned answers to such questions, based on economic analysis of the many factors involved, is the responsibility of USDA's Economic Research Service.

With this issue, the Farm Index presents a series of articles on the seven divisions that make up the Economic Research Service, their goals, their work, their research findings and the contribution they make toward answering the perennial ifs in agriculture.

*M. L. Upchurch, Administrator
Economic Research Service*

MARKETING ECONOMICS

A multi-billion dollar industry has turned itself inside out in the past 20 years.

It has automated its assembly lines, innovated its packaging and product mix, streamlined its buying and selling practices, computerized its recordkeeping, stepped up its advertising program, consolidated plants, decentralized plants, relocated plants—all in an effort to satisfy the consumer and do a better job more efficiently.

This vitalized industry is agricultural marketing—a network of thousands of firms, large and small, that employ several million people to assemble, process, package, ship, store and sell the food and fiber products of American farms.

It is easy to spot a change here, an innovation there. But how are all the changes in all segments of food and fiber marketing affecting the national economy? The farmer? The processor? The

wholesaler? The retailer? And the ultimate consumer, the public?

Providing the basis for answers to such vital questions is a continuing responsibility of ERS's Marketing Economics Division.

Here's what is required:

From government and trade



MARKET STRUCTURE AND COSTS

sources MED pulls together the thousands of statistics which, when compiled and analyzed, become the indicators of trends in

the industry.

MED economists start with prices farmers receive for such commodities as hogs, wheat, vegetables. They add figures on how much of each commodity farmers produce and how much they sell in a year.

Next, researchers gather sales and investment figures for hundreds of representative companies in the marketing system, as assembler, processor, wholesaler or retailer. They learn the number of company employees, their average hourly earnings, the quantity of foods they handle and the value they add to these foods through processing or other service. Finally, they obtain financial statements of various firms to gauge the general profit level.

The trends that emerge from this mountain of statistics show that food marketing is indeed a changed industry, compared with 20 years ago. Workers produce more per hour. Costs per unit of

product are down. Plants are fewer but bigger.

And the public gets better foods, with more marketing services added, for a smaller part of its take-home pay than two decades ago.

This continuing analysis of changes in the marketing system crosses areas of research responsibility within the Marketing Economics Division.

Specific research areas are outlined below:

Market institutions and market power. This research concentrates on changes in the way foods are marketed as they affect the bargaining power of buyers and sellers all along the line—from farmer to processor to wholesaler to retailer and, finally, to the consuming public.



HORTICULTURAL AND SPECIAL CROPS

Do farmers do as well selling direct to the big retail chain stores as they do selling to processors and wholesalers? MED studied direct buying of tomatoes, citrus fruits and carrots in the Rio Grande Valley. Conclusion? For these commodities in this area, at least, retail chains pay as well as other buyers.

Other research projects include:

Discount food stores, their buying practices, prices and profits. Retail florists, their credit rating, their future sales potential (flowers are agricultural products,

too). New canning and freezing plants to aid depressed rural areas, their labor and product procurement problems.

Prices, margins and costs. With income up, the public is spending a smaller part of its take-home pay for food than ever before. But over time, marketing costs more and farmers get less of the consumer's dollar.

This widening price spread in the marketing system is the subject of continuing MED research. To trace the rise in the farm-to-retail price spread, economists follow the trends in the farm, wholesale and retail prices of a "market basket" of foods the typical modest-income family might buy. In general, over the past years marketing costs have increased relative to farm income. This reflects the trend toward more refined products and more marketing services as well as increasing costs of marketing firms.

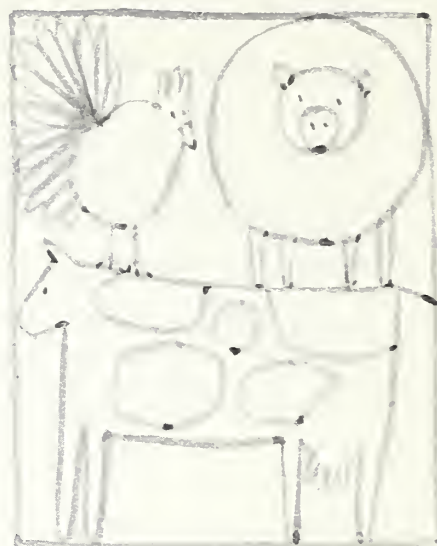
Transportation rates are also a factor in marketing costs. MED specialists assess rate changes and competition among trucks, railroads and barges to help shippers select the best mode of transportation at least cost.

A review of this entire area of prices, margins and costs is published quarterly by the Division in the *Marketing and Transportation Situation*.

Other projects in this research include:

Cost of federal price support programs in terms of storing and handling grains, fibers, oilseeds and other surplus commodities. Proposed changes in grade standards for beef, lamb and lettuce, their impact on farm prices and costs to processors, retailers and consumers.

Location and interregional competition. Just as the textile industry has moved out of New England and into the South, production of some farm commodities has shifted from one section of the country to another in recent years.



ANIMAL PRODUCTS

Analyzing the effect of geographic changes already made and projecting what future changes are apt to mean for producer and marketer alike is an MED responsibility.

For example, most cattle feeding and slaughter operations have grown faster in the West than in the Corn Belt. What effect does this have on channels of trade and the pricing system? What are the economic forces — management techniques, capital investment, transportation costs — which have caused the shift?

More of our grain is exported each year. It used to move through the big terminal points in Kansas City, Chicago and other midwest cities to ports on the east coast. Since railroads lowered grain rates to gulf ports, most of our export grain has gone directly from Kansas, Iowa and other production areas to New Orleans, Houston and other gulf ports. What are future prospects for midwest terminal markets now being bypassed? How much do grain producers benefit from the reduced rail rates?

Other typical projects deal with local and interregional competition:

When and why dairies buy bulk milk from plants outside their

own marketing area. More federal price reporting services for beef producers and handlers in the Southwest, an assessment of the need. The competitive position of the asparagus and tomato canning industries in California.

Products and services. New foods, new forms of old favorites, changes in what people like and can afford to eat, inroads by man-made products in the industrial uses of farm commodities—all are subjects of MED research related to products and services.

Convenience foods are the TV dinners, boil-in-the-bag peas and other processed items that cut down on the homemaker's preparation time. Do these built-in maid services add appreciably to their cost? MED analyzed prices of 158 foods in many forms—fresh, frozen, canned and dried. Result? Many convenience foods cost more than their fresh or home-prepared counterparts. But some are actually cheaper because of reduced weight, bulk and spoilage.

How can dairy farmers maintain their income when Americans are drinking less milk? Perhaps the answer is a low-fat milk

with fewer calories than whole milk, more taste than skim milk. MED economists found the compromise product did attract some new milk drinkers, but didn't up total milk sales much.

Other typical research projects:

A new way to trim hides to meet competition from synthetic shoe materials. Market tests on such new products as sweet potato flakes, dehydro-frozen peas and apples, sterile concentrated milk.

Merchandising and promotion.

Can farmers increase sales through advertising and other market promotion programs? If so, how much money should be spent to get the best possible response? And what kinds of promotion programs are most effective? What kinds of packaging do consumers prefer? How much space should retail food stores devote to frozen foods in view of the costly refrigerated equipment required?

These types of questions are explored by MED in its merchandising and promotion research. Such studies help both farmers and the food industry make more effective use of their promotion dollar.

For instance, one study showed Florida citrus growers who stepped up their promotion program sold three times more fruit than the cost of the increased promotion. About the same results showed up when dairy farmers promoted milk through their cooperatives.

Other typical research projects in merchandising and promotion:

Meat departments of retail stores, how manpower can be more efficiently used. Consumer preference for packaged, compared with grapefruit displayed loose.

Distribution programs and market outlets. This last part of MED research evaluates how well our public food aid programs are serving the nation's needy people and measures the markets that

these programs provide for the food industry.

Is the National School Lunch Program reaching all our needy children? An MED survey showed the answer to be *no*, mostly because older schools don't have kitchens. What about one central kitchen to serve several schools? MED showed this would work, at the very least, for cold-packaged lunches in the most depressed areas.



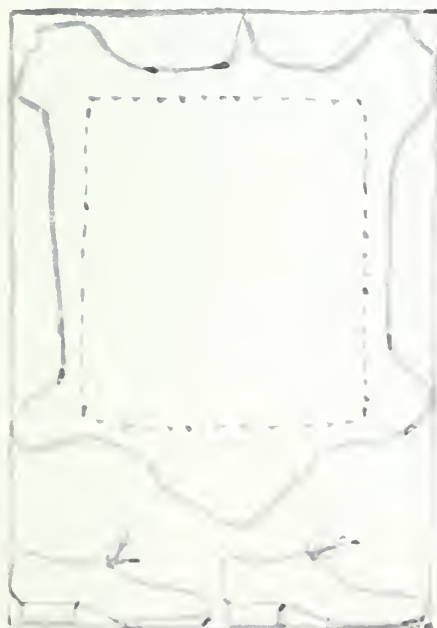
MARKETING DEVELOPMENT

What does the School Lunch Program mean in sales by the food industry? MED reports it is a \$1-billion-plus market.

Other typical research projects:

The Food Stamp Program, its contribution to higher retail food sales and better diet for the nation's needy. The fast growing market for food in restaurants, snack bars and other away-from-home eating places.

Summing up, the research responsibility of ERS's Marketing Economics Division is, in the broader sense, to study problems in the rapidly changing food and fiber marketing industry. Based on research findings, the industry can find ways to cut costs, operate more efficiently and, at the same time, strengthen the markets both here and abroad for American-grown foods.



MARKET POTENTIALS

This is the second in a series of articles on the seven divisions that make up the Economic Research Service. The series highlights the research studies and findings that help to answer the perennial ifs in American agriculture.

FOREIGN REGIONAL ANALYSIS

Somewhere in the world four children are born every second. Five years hence there will be over a half billion more people to feed than five years ago.

Can their own countries grow enough to feed them? Or better, produce a little more per person than their parents had? Will the over-populated, underdeveloped nations have enough foreign exchange to buy food from the United States and other suppliers? Will U.S. food aid still be needed? If so, how much? And to which nations?

These are broad questions that require detailed answers—for Congress as it formulates future foreign aid policy, for government officials who carry out the Congressional mandate, for agriculture which must produce the food, for the export trade which must get it overseas.

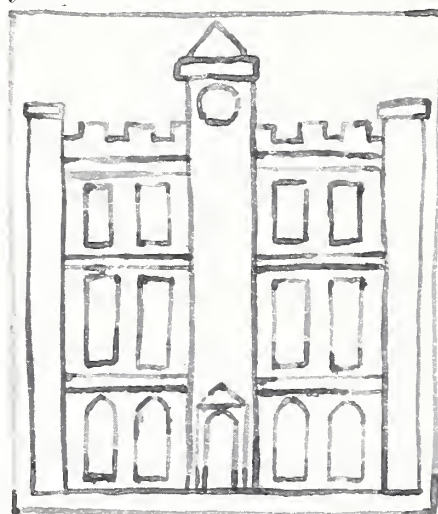
Producing a balance sheet of the world supply and demand for food five years from now—a *World Food Budget* to help answer such questions—is one responsibility of the Foreign Regional Analysis Division.

Somewhat simplified, this is what the assignment entails:

Start with 92 countries, containing 94 per cent of the world's people. (Information on such places as Outer Mongolia is too sparse to consider.)

Assign economists, working with the best available figures, to determine how much wheat or rice, how much meat and other food basics each country used in a recent 3-year period. Make this the base period for projections

five years ahead. Since there are 10 basic food groups, this initial phase repeated in 92 countries requires a total of 920 separate projections.



EUROPE

But wait. For many countries, the best available figures aren't good enough. Conduct in-depth studies of what is known about their agricultural economies and fill in gaps with estimates of crop and livestock production, based on such fragmentary information as can be found.

Next, study the factors in each of the 92 countries which are apt to help or hinder efforts to raise food output. Acreage in use or available. Climate and irrigation. Agrarian structure. Farm labor force. Production practices. Government policy. Social customs. Transportation systems. Education. Accounting for all these factors, project world food output over the next five years.

Now look at food needs in terms

of people. Calculate whether the projected output in each of the 92 countries will be more or less than its people will need for a somewhat better diet than they now have.

Finally, add up supplies in food adequate countries, balance them against supplies in deficit countries.

Result? A *World Food Budget* that shows the food gap in the less developed world—most of Latin America, Africa and Asia—will still be running into billions of dollars over the next five years and probably beyond.

At the same time the *Budget* is so detailed that FRAD can pinpoint which countries will probably be most in need of which types of foods and in what quantities.

This is an example of a major research project and the analytical approach to it taken by the Foreign Regional Analysis Division. Here are the Division's broad areas of research responsibility:

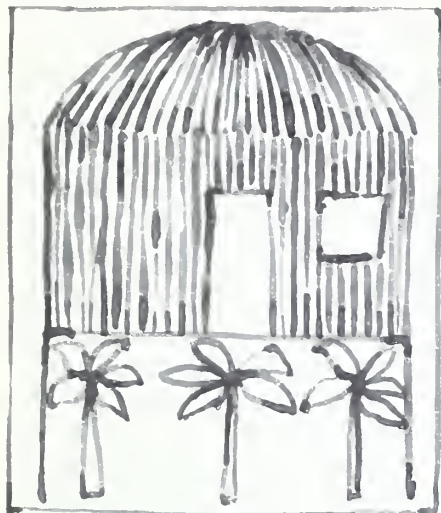
Long-Range Outlook for U.S. Agricultural Exports. The *World Food Budget* is the first responsibility in this research area.

The second is to make long-term projections—usually 10 to 15 years ahead—of how much food and fiber is likely to be produced in individual countries, the major regions and the world. Purpose of these supply-demand studies in over 30 countries is to gauge their probable farm exports and imports in the future.

A supply-demand study of Italy to 1975 is typical of the in-depth

analysis required. Look at population trends and project them to 1975. Study economic growth patterns to project national and per capita income. Assess present and potential farm acreage, yields and technology. Consider government programs to aid agriculture.

This analysis showed that the Italians' demand for food will



AFRICA—WEST ASIA

likely grow faster than their own agricultural plant can produce it. Implication? We may be selling far more meat, feed grains and other commodities to Italy by 1975.

FRAD also analyses such problems as: What share of the world market for farm products can the United States expect to have in the next five to 15 years—and, more important, what we can do to increase that share?

Australia and New Zealand agree to set up their own free trade area, much like those in Central and South America. What effect, if any, will this have on U.S. trade with the two countries?

The Soviet Union may again have grain to sell in Western Europe. Will U.S. grain be competing in the same market?

The last responsibility in FRAD's long-range outlook work is to estimate what is the probable future for U.S. exports of specific commodities. Will our wheat

exports grow or decline in the years ahead? What about feed grains? Cotton? Soybeans? Our other major export commodities?

Current Situation and Short-Run Outlook. As opposed to long-term projections, this area of FRAD's research responsibility deals with what is happening this year—and next—in the farm production and trade picture of some 84 countries.

Will Australian beef production be down next year? Does this mean the United States will likely import less beef and that beef prices will be higher here at home?

Is Communist China having still another poor crop? If so, will it be buying wheat again from free world sources? Does this mean Canada, Australia and other suppliers will be competing less actively with the United States for sales in Western Europe and Japan?

Such questions are analyzed by country and compiled each year in a single report that becomes a world overview of agricultural production for the year just past and trade prospects for the year ahead. This *World Agricultural Situation* is supplemented by more detailed regional reports for the Western Hemisphere, Africa, Asia and Europe.

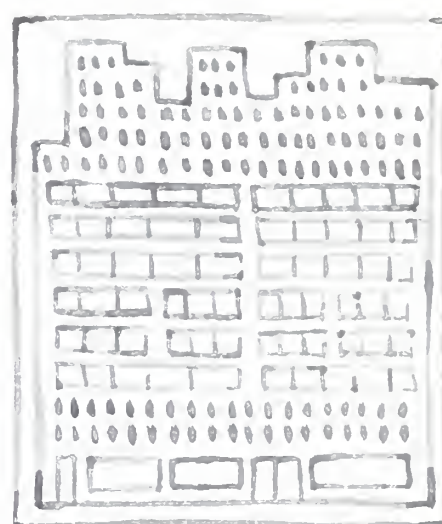
Underlying these studies are three statistical series which are



FAR EAST—OCEANIA

updated regularly. Annual indices measure the progress or slippage in 84 countries. Food balances assess the size (including imports) and quality of food supplies in these same countries. Finally, farm trade statistics are analyzed each year.

Another responsibility in this area of current situation and



WESTERN HEMISPHERE

short-run projections is to publish information—usually every five years—on government farm policies in 124 countries. Has Ghana raised or lowered tariffs on imports? What is the policy of the European Economic Community on vegetable imports from non-member countries? Does the Pakistani government or the private trade handle foreign sales and purchases of most foods?

Finally, economists in this research area prepare briefing papers for the Secretary of Agriculture, Congress and others. This is particularly true of the Division's Soviet and East European specialists who serve as one of the few official U.S. channels for information on Communist agriculture.

In sum, the Foreign Regional Analysis Division applies the principles of economic research to help disclose opportunities for new or better markets around the world for the products of American agriculture.

This is ERS . . .

This is the third in a series of articles on the seven divisions that make up the Economic Research Service. The series highlights the research studies and findings that help to answer the perennial ifs in American agriculture.

FARM PRODUCTION ECONOMICS

Three million commercial farms, all different in one way or another, are scattered the length and breadth of America.

Three million commercial farm operators, working silt or loam or clay, in cold climate and hot, on big farms and small—all have to make many management decisions each year.

Plant corn or switch to soybeans? Irrigate cotton? Add a livestock enterprise? Retire more land under government programs?

What will each of these alternatives cost? What will each return in net profits?

The decisions of a single farmer, right or wrong, don't noticeably affect the complex market mechanism that assures the nation and our export markets an adequate supply of food and fiber. But the decisions of 3 million farmers, taken in the aggregate, certainly do.

A government with responsibilities to farmer, to consumer and to taxpayer alike needs to know—in advance—what the decisions of the agricultural community are apt to be.

How will farmers probably react to changes in present and proposed farm programs? How much wheat would they grow if price supports were raised or lowered next year? The year after? What about cotton? Dairy products? Tobacco?

What's needed is a national "picture" of commercial agriculture based on farmers' past decisions in an almost infinite variety of situations, a representation that researchers can use to predict farmers' likely year-to-year

reactions to an almost infinite variety of changes.

Constructing a national "model" is one important step by which ERS's Farm Production Economics Division (FPED) captures the national picture of commercial agriculture.

Such an intricate model can be

livestock enterprises.

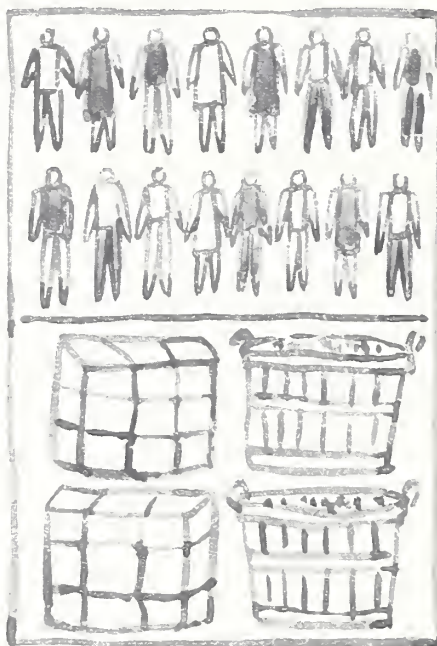
One region in the Corn Belt shows the scope of the problem. Here researchers have identified 20 specific alternatives that farmers can take. They can, for instance, grow corn or soybeans or wheat or oats or hay or some combination of these. They can produce hogs or beef or dairy cattle or a combination. They can accept or reject government payments tied to production controls under the feed grain and wheat programs.

For each alternative and combination thereof researchers estimate what yields and prices farmers can likely expect. These are calculated for each year to which the model is applied. For the same years researchers estimate how much fertilizer, labor, capital and other inputs are needed for each alternative crop or livestock operation. And finally they figure the costs of these inputs. From this mass of data economists estimate how much farmers can earn from each alternative.

But what farmers can earn is only one side of the coin. They have only so much land, labor and capital. Their decisions are also influenced by personal preference, their own farming skills and by government programs.

Economists recognize these factors by adding to the model certain "restrictions" on the farmers' choice of alternatives. The region in the Corn Belt, for example, includes 50 such restrictions. Some of the other regions are far more complicated with up to 160 alternatives and 200 restrictions.

Once the alternatives and re-



PRODUCTION ADJUSTMENT

constructed only in the computer age. But computer answers depend on manmade inputs.

To program the computer here's what FPED economists have to do:

First, recognize the diversity of American agriculture. At present this is done by dividing the country into 47 geographic regions, then subdividing these regions into 97 farm types that encompass major combinations of crops and

strictions are spelled out for each region, the model is programmed into the computer. For years to come the computer can now help researchers provide timely economic intelligence on production responses.

The national model is but one project in one of the six major areas of research in the Farm Production Economics Division:

Agricultural Adjustments, Production Response and Farm Program Appraisal. Basically this area addresses the problem: How can American agriculture redirect its physical resources, its know-how and technology to produce enough food and fiber for our own needs, for foreign aid and for commercial exports without producing an overabundance that could jeopardize farm income?

Like putting together a jigsaw puzzle, this broad research commitment requires investigation of one piece at a time.

FPED economists, for instance, have shown how dairy farmers in the Lake States could raise their income by upgrading the quality of their cows, by increasing herd size and for the larger herds by switching from stanchion barn milking to a loose housing milking parlor.

Under allotments in one recent year rice farmers in the Delta States harvested about 1 million acres; the price they got for rice was about \$4.85 a hundred pounds. Without any production control program and using up-to-date methods, how much would they grow?

Studies indicate that at \$4 a hundred pounds, rice farmers in the Delta could still make a profit by increasing output through expanding rice acreage to 2.5 million acres. At \$3, however, they would improve profits by switching to other crops and cutting riceland to 1.3 million acres. At \$2.30 a hundred pounds, farmers would cut back total rice acreage to about 200,000 acres.

What about the government's

farm programs? How do they work at the farm level? Congress and other government officials need answers to these questions in planning future programs.

FPED economists, for example, surveyed farmers in the Corn Belt and the Texas High Plains who participated one year in the feed grain program and compared their profits with farmers who did not. In both areas more than half the farmers did better financially under the programs.

Structure of Agriculture and Economics of Farm Size.



PRODUCTION RESOURCES

Agriculture has adopted new machines, new management techniques, new ways of doing business with suppliers of farm inputs and buyers of farm products.

The changes have raised questions. Farms are getting bigger, but there are fewer of them. Is agriculture being taken over by the big commercial firms? Does this mean the end of the family farm, the cornerstone of our agriculture for three centuries?

At what size does a farm become most efficient?

What effect does this changing "structure" of agriculture have on farm income, use of land and labor, age of farmers and their tenure, that is, how much land they own, how much they rent?

All these interrelated trends are being closely watched and analyzed by FPED economists. And some positive answers are emerging:

No, the family farm isn't disappearing. If anything, it's stronger than ever. True, there are about 2 million fewer farms in the mid-1960s than back in 1949. But research shows that nearly 90 per cent of the farms with gross sales of \$10,000 or more today are run by families with mostly family labor. And this group of family farms is the fastest growing sector of the agricultural economy.

Moreover, farms need not get "big scale" to be run efficiently. FPED analyzed cotton farms in Texas and California, dairy farms in Minnesota, and beef cattle ranches in Colorado. In each case a medium-size operation had unit costs as low as a large operation.

Among other subjects in this research area: How much land and capital must a farmer have to earn \$2,500 to \$5,500 a year for his own work and management? What are the pros and cons of contract farming, an arrangement whereby a farmer grows-to-order for a predetermined buyer?

Agriculture Finance. To fulfill this research responsibility economists analyze the capital that farmers have or need, their debts and assets.

Keeping tabs on the financial condition of the nation's farmers—and what their future position is apt to be—is the basic job in this research area. Economists assess farm capital and credit needs, farm assets and farm debts. And once a year the Division adds up all the assets, compares them with farmers' debts and other claims and issues a *Balance Sheet of Agriculture*.

Yearly, too, the Division studies

the factors that affect agriculture's financial health. Are interest rates rising? Is credit getting tighter? Are farm debts pushing against safe limits? Past trends and future prospects are published in *Agricultural Finance Outlook*.

The Division conducts in-depth studies of farm credit. One such study in Missouri and Montana showed rural homeowners often couldn't get the long-term mortgages that city owners get. The study buttressed the need for the rural housing programs of USDA's Farmers Home Administration.

Then there's the problem of how much insurance farmers have or need to protect against crop losses due to weather, fire and other hazards. Division economists surveyed farmers in Montana and Virginia after both states had been hit by severe drought. Crop insurance had saved many farmers from serious financial losses.

Farmland Values and Valuation. How much have land prices gone up in the last few years, for example, on farms in Alabama, orange groves in Florida, rangeland in Montana? Do farmers make as much farming as they would investing in stocks?

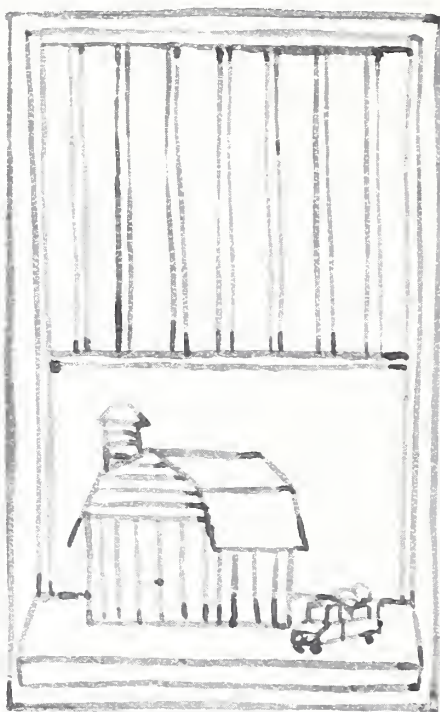
Answers to such questions flow from FPED's twice yearly pulse-taking of the farm real estate market. A voluntary corps of 8,000 farm real estate reporters and 15,000 farmers send in data on actual selling prices of farms, types of sellers and buyers and their methods of financing.

They also estimate how many sales are voluntary and how many are foreclosures. Then from these figures FPED is able to calculate how much farmland is worth per acre in every state in the country.

Results sometimes seem surprising. For instance, farmers in one recent year netted more—4.4 per cent on market value—from farmland than if they had invested in stocks; the dividend rate

for all common stocks that year was only 3.1 per cent.

Economics of Farm Labor, Practices and Technology. Wages that farmers pay hired workers continue to climb. Farmers have been responding by using more and better machinery and equipment, chemical weed killers, minimum tillage and other laborsaving methods. Such methods, together with higher yielding crop varieties, more fertilizer and better livestock now enable one farmworker to produce more food and fiber than ever.



FARM CREDIT

But laborsaving methods aren't likely to do away with all need for hired workers, depending on size and type of farm. Meantime, wages that farmers pay are more in competition with industrial wages and benefits.

What's ahead for farm workers? Minimum wage legislation? Unemployment insurance? Workmen's compensation? Other fringe benefits? A major Division responsibility is to keep abreast of such possible developments and analyze their probable effect on

agriculture.

A publication called *Changes in Farm Production and Efficiency* shows the trends and their implications in the number of acres we cultivate, the amount of fertilizer we use, how many livestock we have, how much feed they eat, how much food and fiber we produce for each hour of labor and in many other aspects of the farm scene.

Farm Costs and Returns. Farmers used to produce most of their own fertilizer, seeds, livestock feed and other production inputs. Today they buy most of these things and if the cost goes up faster than the price they get for what they grow, net income suffers. To help farmers plan for the year ahead FPED analyzes what's been happening to such costs and indicates the outlook. Conclusions are published each fall in the *Farm Cost Situation*.

Another broad project in this area of costs and returns explores these questions:

What incomes, gross and net, are experienced farmers running typical commercial farms actually earning? How much do they have invested in land and buildings, in machinery and equipment, in livestock? What are their operating expenses?

The Division answers such questions each year for 42 major types of commercial farms in 24 big farming areas of the country. They include farms as small as a 10-acre egg operation in New Jersey and as large as a 1,300-acre cotton farm in California.

As the name implies, then, the Farm Production Economics Division is the one group in the Economic Research Service that deals with all the management aspects of producing the nation's food and fiber. Its basic purpose is to provide research that can help farmers, policymakers and others make sound decisions in a growing economy which generates new capabilities—and new problems—year by year.

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FOREIGN DEVELOPMENT AND TRADE

Standing in the south 40 in the midst of his ripening grain, the Kansas wheat farmer is a long way from Kobe, still farther from Madras.

Yet Japan is his top dollar market for wheat abroad. And India is the top recipient of wheat under our foreign aid programs.

Today the two nations are studies in contrast. Japan has a vigorous expanding economy. India is struggling to feed a population over twice the size of ours in a land area only one-third as large as in our 50 states.

It wasn't always so. Japan was a major beneficiary of U.S. aid for more than a decade after World War II. And our aid paid off in a rejuvenated Japanese economy that could buy U.S. goods for dollars.

But is Japan an isolated case? What about India? What about the 100 or more other countries still getting U.S. food aid? What's the prospect of their becoming cash markets for our farm goods? Once U.S. aid has helped them produce more of their own food will they buy less from us? Or once they earn enough foreign exchange to buy food abroad, will they buy from somebody else?

These questions have caused concern in Congress, among farm groups and in the export trade. And for good reason. Today the export market takes a sixth of all we grow, \$6 billion worth or more. With world population and income growing, this market should get bigger. But will it?

A logical way to answer such questions is to find out what na-

tions actually *do* earn, produce, import and export as they move up the economic ladder.

Conducting the complex analysis was the task of ERS's Foreign Development and Trade Division (FDT).



INTERNATIONAL MONETARY RESEARCH

For 87 countries, developed and less developed, FDT economists first traced what had happened to income, total and per capita, in the 20-odd years between the start of World War II and the start of the 1960s.

For the same two periods for the same 87 countries they next analyzed changes in *total* imports and exports, that is, industrial and consumer goods, including farm products.

Finally, they compared the farm trade picture alone for 1959-61 with what it was prewar. This was done for 57 countries, all those where adequate figures were available.

Based on these past trends, Division economists were now able to project what's likely to happen to our exports in the years ahead. And results show that the very nations we are aiding today are apt to be cash customers in the future.

Looking first at the developed world—Europe, Canada and Japan among others—the analysis showed that developed countries will buy from us more industrial and other nonfood consumer goods than food. Imports of food go up only 7 per cent with every 10 per cent increase in per capita income; industrial and other imports jump 11 per cent. But the less developed world—much of Latin America, Africa and Asia—will import more food. While total imports should jump 11 per cent for every 10 per cent increase in personal income, farm imports bought from the United States *for cash* could increase as much as 21 per cent for every 10 per cent rise in personal income.

By 1980 our farm exports should run about \$9.3 billion a year, double the 1959-61 average. And \$8 billion of this will be dollar sales, not aid shipments.

This study is typical of the work of ERS's Foreign Development and Trade Division. Still, it's only one project in one of the Division's four major areas of research:

Effects of Foreign Economic Development on Agriculture. Unlike our own industrial economy, the less developed nations rely on agriculture to support over two-thirds of the labor force and provide about half of the national income. This means that any marked improvement in people's income and living standards must be generated first by raising farm output, farm marketings and consequently farm income. Long-range, it means farm output per man has to be improved in order to free workers for jobs in industry.

FDT's role in this research area is to pinpoint the factors that help or hinder agricultural progress.

Is a country's traditional way of using its land and water resources the best way? Is an inequitable tax structure dampening the farmer's incentive to produce more? How can local beliefs and customs be used to introduce new farm technology? What improvements are needed in transportation, education and health as they pertain to farm people and farm output?

In short, what are the priorities that governments should give to these many pressing needs in setting up development programs?

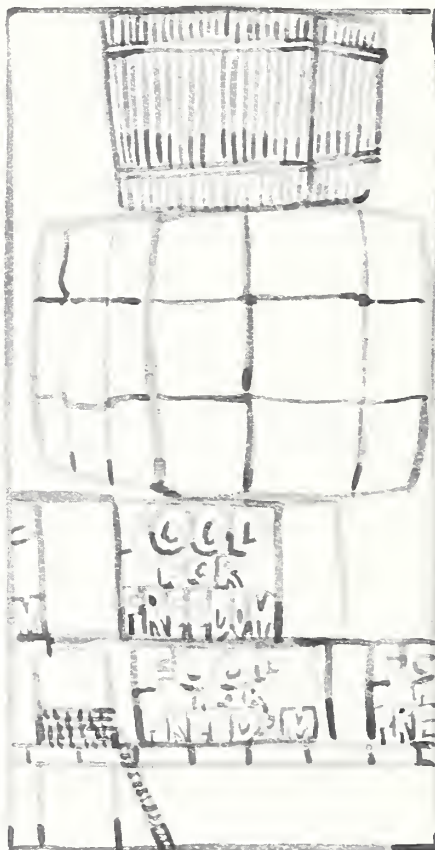
The plight of the less developed nations is by no means hopeless. One recent FDT study showed that 12 countries as diverse as Taiwan and Brazil have upped farm production faster since 1948 than the United States itself did in any comparable period.

The study shows that where land is limited, more workers can be added for more intensive cultivation of what land there is.

Take Taiwan. The island's land suitable for agriculture is very restricted. So the develop-

ment program was designed to make each acre produce as much food as possible. This was done by stressing irrigation, use of chemical fertilizer and better seeds, coupled with improved ways of tilling the soil and by growing two or more crops a year. As a result, Taiwan has maintained a high rate of increase in farm output.

Export Programs and Market Development. Nearly half of all



EXPORT PROGRAMS RESEARCH

U.S. foreign aid is food aid. It is as diverse as shipments of dry milk to Pakistan, poultry to Iraq, even lentils to Guinea.

Whatever its form, food aid is a big program and its effectiveness is being constantly evaluated by the Division's international specialists. Their purpose is to give Congress and foreign aid officials an assessment of the program in various countries that will help them in deciding

whether to keep or change the present emphasis.

Examples are studies of the food aid programs in Spain, Turkey, Israel and Colombia. Thanks to our program, people in all four nations have received more and better foods at prices they can afford. Food aid sales have helped to finance industrial and farm improvement projects. And with their economies thus strengthened, these countries have been able to up commercial imports of food from the United States.

The Division's market development work deals with the everyday problems that most developing nations face in trying to get their imports and homegrown foods distributed to the people. Are storage, refrigeration, transportation and processing facilities adequate? One FDT study suggests the answer is *no* in most cases. As per capita income goes up, most developing countries, unless they plan ahead, won't have the marketing structure to supply the foods their citizens can afford to buy.

International Monetary and Trade Research. Like a bookkeeper entering debits against credits in a firm's accounts, FDT specialists in this research area keep a running tally of the financial position of 111 countries.

There are several reasons for this international bookkeeping. First, it gives foreign aid administrators guidelines for deciding how best to sell a less developed country the food aid it requests. (Aside from small donations and emergency feeding, food aid isn't a 'give-away program.') Can Malawi afford long-term credit payable in dollars? Or should our food aid be sold for Malawi's own currency, part of which will be used for that nation's development program, part of which will go to defray U.S. embassy and other costs in the country?

To what extent do our agricultural exports lessen our balance

of payments problem? Our military and other commitments around the world drain our reserves. Dollars earned by farm exports help to replenish them. FDT monetary experts trace the intricate ebb and flow of foreign exchange to show that our balance of payments deficit would be several billion dollars larger than it is each year without the money earned by U.S. farm products abroad.

Trade research assesses regional and world problems that have a direct bearing on U.S. trade. For instance, FDT economists have shown that something needs to be done about the maze of conflicting subsidies, tariffs and overlapping restrictions that both grain importing and exporting countries use to protect their own farmers. The present situation, researchers show, threatens to disrupt the world grain market in the years ahead.

Other trade research investigates such problems as how the policies of the European Common Market are going to affect U.S. grain and meat sales to the six-member group; prospective trade relationships with the Central and Latin American Common Markets and other regional groups; and the present and proposed international agreements on sales of wheat, cotton and other commodities that might assist or retard U.S. sales in foreign markets.

Trade Statistics and Analysis. How much wheat, corn, soybeans, cotton, tobacco and other commodities is the United States selling to the United Kingdom this year? To Canada? To Costa Rica? To the entire world?

How much are these agricultural exports worth in dollars and cents? What is the outlook for these exports next year? The year after? What share of these exports represents sales from farms in Iowa, Texas, Georgia and the other 47 states?

What's the tonnage and dollar value of foods we import, such

commodities as sugar, coffee, cocoa and bananas?

Compiling the thousands of figures and analyzing the major factors and developments that affect our import-export position is another basic responsibility of the Foreign Development and Trade Division.

Data compiled by the Division show that our farm exports in the last few years have set a new record almost annually. And sales



TRADE STATISTICS & ANALYSIS

for dollars, in contrast to aid shipments, have gradually made up a larger part of these total shipments every year.

However, U.S. trade statistics tell only part of the story. What other countries are buying and selling among themselves can cause shifts in U.S. markets abroad. Are Mexico's cotton sales to Japan hurting our trade? Has the Netherlands, benefitting from its membership in the European

Common Market, taken much of our poultry business in West Germany, also a member?

To get such answers FDT has recently started to analyze figures on 150 commodities traded among 70 countries, which together account for 90 per cent of world trade in farm products.

These trade trends in turn help to formulate the U.S. position on international issues.

The Division also does special studies on the impact that customs unions and other trade bloc arrangements have on world farm trade. For instance, the European Common Market has a farm policy that sets up variable levies on many commodities. What impact will this policy have on future U.S. exports?

The Division issues its trade analysis findings in a monthly publication, *Foreign Agricultural Trade of the United States*.

In summary, much of the work of the Foreign Development and Trade Division is devoted to the principle that Americans can help other nations help themselves. The Division provides much of the research that assists our policymakers and those of other nations in doing a better job for this humanitarian purpose.

But another basic concern of government is to help American farmers sell more of their products in foreign markets. To this end it is the Division's job to keep a thumb on the pulse of world trade, to spot changing patterns and to see emerging market opportunities for American agriculture.

This kind of economic intelligence spans the miles between Kansas and Kobe. In a sense it brings the American farmer face to face with his customers in Japan and scores of other countries. It enables him to look ahead and plan ahead, to grow the foods that will sell in overseas markets and in the end to strengthen his own financial position and that of the American economy.

This is ERS...

This is the fifth in a series of articles on the seven divisions that make up the Economic Research Service. The series highlights the research studies and findings that help to answer the perennial ifs in American agriculture.

ECONOMIC DEVELOPMENT

Nestled close to the Catskill Mountains is a four-county rural area in southeastern New York State that should be prosperous, but it isn't. Recreation is underdeveloped, but has high potential. Dairying and poultry production are important farm enterprises. Nonfarm employment is chiefly in light industry and services of various kinds. While total population in the area has increased since 1950, the farm sector has been declining. Median income in the four counties, while up from 1949, is below the level of the state and the nation as a whole.

The Economic Development Division (EDD) recently completed an analysis of these four New York counties. The results are being used to assist the Farmers Home Administration, which is conducting an improvement project in the area. The analysis provided facts about population, income, employment, social services and other factors which would help the residents to help themselves.

It was found that a better highway system is needed in order to adequately promote recreational enterprises and to provide more efficient commuting to nonfarm jobs. Much of the housing in the area is used only seasonally. It is felt that encouragement should be given to making year-round use of these housing units. Population trends indicate that many new housing units will be needed; many existing houses are in need of substantial repair.

It was found that drinking water supply and sewage disposal

systems are inadequate. Water pollution is a threat. Medical personnel and facilities in the area compare favorably with the rest of the state at the present time.



HUMAN RESOURCES

With a continued increase in population, expansion would be required. A look ahead would indicate planning for it now.

The study showed a need for

training of the people who are leaving agriculture and seeking nonfarm employment. While the overall educational indices in the area are favorable, the residents wanting employment in recreation enterprises, nearby factories, and the service industries don't have the necessary skills to compete for available jobs.

This analysis in four New York counties is an example of research service provided by the Economic Development Division for "action programs." The Division carries out economic and social analyses to help find ways of bringing rural America into the mainstream of our prosperous national economy.

To the west and south of the Mid-Hudson area are the 370 counties of Appalachia. The counties are typically combined into areas containing six or seven counties which serve as the focus for development planning.

Appalachia as a region contains many isolated mountain hamlets, dirt roads and patches of poor farmland. It's a region of some 24 million people, many of whom have been bypassed in the nation's onrush of prosperity.

For this reason Appalachia is a prime target in the nation's war on poverty. But there are other equally important targets—the Ozarks, the Mississippi Delta, the Southeastern Coastal Plain, to name just a few.

As in any war, strategists in the war on poverty must first know what they're fighting.

Who are the rural poor? How many are there? Does the average family have two children or

seven? Where are they located, on farms or in small communities? Why do some people stay in poverty and others escape from it?

What are their ethnic origins that might bear on the kind of work they want or do well? What are their age limitations and physical handicaps, if any? What skills do they already have as carpenters, mechanics or storekeepers that could be put to better use? What extra training do they need to qualify for higher paying jobs?

Such questions need answers before public programs can be made fully effective. What is required is a composite "picture" of the rural poor, their needs, aspirations and prospects.

Compiling this picture is the responsibility of ERS's Economic Development Division.

EDD specialists first devise a questionnaire that covers the significant questions. Interviewers will then take the questionnaires personally to the people concerned—families that represent a sample of those living in the major depressed rural areas.

The Division will next tally and evaluate the answers to questions returned by each of these hundreds of families. And the picture of rural poverty will begin to emerge.

But people are only one part of the equation for success. Another part is the community in which they live.

What services do local government and private groups now provide to help the poor get better jobs or train for better jobs? What added services could the community finance on its own? What services need federal assistance?

EDD is asking local governments to answer these and similar questions. Once these answers are in, researchers can pair needs of people with the community's potential for helping them. Where local need exceeds local potential, federal war-on-poverty funds may be earmarked to fill the gap.



COMMUNITY FACILITIES

The Mid-Hudson and Appalachia projects are representative of the work of the Economic Development Division, which has three broad areas of research responsibility:

Human Resources. People are now leaving farms in expectation of a better life in the city at the rate of nearly a million a year.

Who are these people? Young or old? White or nonwhite? Well or poorly educated? And do they really earn a higher income and live better in the city? Answers to such questions are required to plan assistance programs that will be of most help to such people. EDD studies, based on nationwide surveys of the actual people concerned, provide many of the answers.

For example, one study confirmed the assumption that farm-born migrants to the city tend to take lower skilled jobs than people born and reared in the urban complex. But the unemployment rate of the migrants isn't any higher than that of their city-bred neighbors.

It's been generally assumed that the farm population is fast becoming a population of the elderly.

The facts show otherwise. According to an intensive EDD survey, just under 10 per cent of all farm people are over 64. Just under 10 per cent of all people in urban areas are likewise over 64.

Social statisticians working in this area of human resources also study the living conditions of farm residents and their education as it affects their earning power.

They are concerned, too, with the lot of migrant farmworkers, the pickers of lettuce and tomatoes and apples who work by the hour and move north from harvest to harvest. One such study showed that some of the Spanish-Americans from the Southwest who move into Michigan each summer set up permanent homes there, but most go back where they came from. However, those who stayed in Michigan ended up with twice the annual income of those who continued to move back and forth.

Community Facilities. The schools, libraries, volunteer fire houses and other public facilities springing up all over rural America cost money. And much of the money has to come from farm real

estate taxes which have tripled since World War II.

EDD research explores ways in which local governments can pool resources to provide better public services, or completely new services, at the least possible cost. Hopefully, this in turn will help to keep taxes in check.

One study examined the legal and practical aspects of intergovernment cooperation in five states. Out of this research came the recommendation that a central clearing house on local government be set up in each state. Here a local official with a problem could find out how other jurisdictions are meeting similar problems. The center would also have management and legal advisors to assist local officials.

Community facilities research

also deals with the extra public services needed when a new industry moves into a small town. Will the taxes generated by the industry itself and by the new jobs it creates offset the added expenses of more schoolrooms, more fire and police protection and related services?

Area Analysis. Poverty in rural America doesn't exist in a vacuum. Its economic effects reach out to Detroit in the cars that aren't bought, to California in the oranges the poor can't afford, and similarly, to nearly every consumer industry and service in the country.

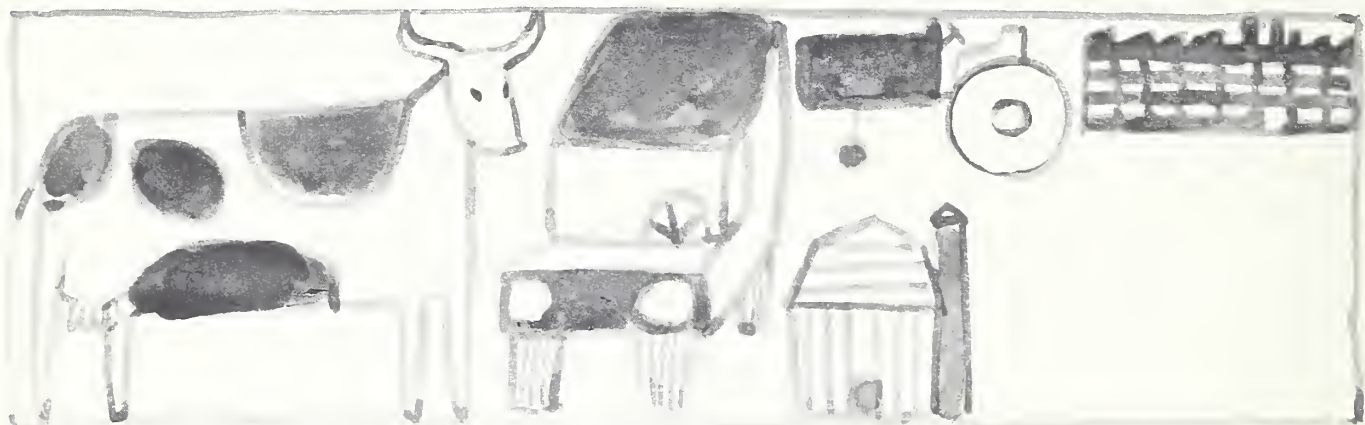
This interaction between the rural and urban economy is EDD's third major research area.

Here's a typical problem: In Appalachia, does basic industry—

glass manufacture, textiles, food processing—generate more jobs and income than service industry, such things as motels, restaurants and theaters?

Somewhat surprisingly, EDD found the answer to be no. Specialists who analyzed employment figures for 1950-60 concluded that more jobs and larger incomes are generated by service industries. What is happening, they suggest, is that people with good jobs and mounting incomes in periphery cities like Pittsburgh and Atlanta are spending part of the extra money on recreation and travel in the rural areas of Appalachia.

What can one new plant in a small rural town mean to the economy? Division economists picked Mumfordsville, Ky., to study after a new bedding manufacturer's



AREA ANALYSIS

first full year of operation there.

Result? The plant provided 111 new jobs in town, another seven elsewhere in the county and 132 outside the county. Most of the jobs are for unskilled women. Unemployment compensation in Mumfordsville has fallen off markedly.

What's the outlook for jobs in agriculture in the Missouri Ozarks by 1975? Not good, according to another EDD analysis. Back in 1959 over 24,000 farmers earned more than \$4,000 net. By 1975 the number will be down to about 14,000.

What about turning farms into

recreation sites? Economists studied the potential in Ohio and Indiana by surveying city people who used existing sites. They found that people participate in swimming and picnicking most. They discovered, too, that families with \$6,000 income spend all or part of only 38 days a year on outings in the country; those with income of \$12,000 spend 58 days. Such facts on recreation users help the prospective developer evaluate the potential users of his facility, how long they might use it each year and where they would come from.

In conclusion, ERS's Economic Development Division studies the

economics of rural life as it affects human beings. Its concern is the welfare of people caught in an economic backwash. More important, EDD does the research that helps officials decide how we as a nation can go about reversing the trend of poverty.

A big job remains to be done in the 11-state region called Appalachia and in similar regions where poverty is prevalent.

Economic development is the key to financial—and social—progress. Helping to determine how the key should be made is the job of economic development research.

This is the sixth in a series of articles on the seven divisions that make up the Economic Research Service. The series highlights the research studies and findings that help to answer the perennial ifs in American agriculture.

ECONOMIC AND STATISTICAL ANALYSIS

What shape is American agriculture in today? How much money are farmers getting for what they grow? How much do they get for cooperating in government programs?

How much money has to be spent to run our farms and ranches? How much income do farmers have left over after paying production expenses? How much is this in total—how much per farm—how much for big farmers compared with small ones?

Will next year be a better or worse year than this for wheat, beef cattle, dairy products and cotton?

What will U.S. agriculture look like 10, 15 or 20 years from now, based on apparent trends in prices, technology, our own domestic needs and export markets?

Many groups need answers to these and similar questions—Congress and other government officials in planning future farm programs; farmers themselves in deciding what or what not to produce; food manufacturers in choosing what to process; retail stores in selecting what to stock.

Providing the answers and keeping these answers updated is one task of ERS's Economic and Statistical Analysis Division (ESAD).

Typical of the in-depth analysis needed is an ESAD study of the ability of U.S. farmers to grow more food to help feed more people abroad under our foreign aid programs. Developing countries with fast-growing populations are going to need food aid for a while until they can more fully develop

their own agriculture or industry. But does the United States have the potential to produce the needed food?

Economists first looked at the cropland acreage the U.S. now cultivates, plus the cropland in fallow. They also considered the

cropland now diverted from production under government programs that could be put back under the plow.

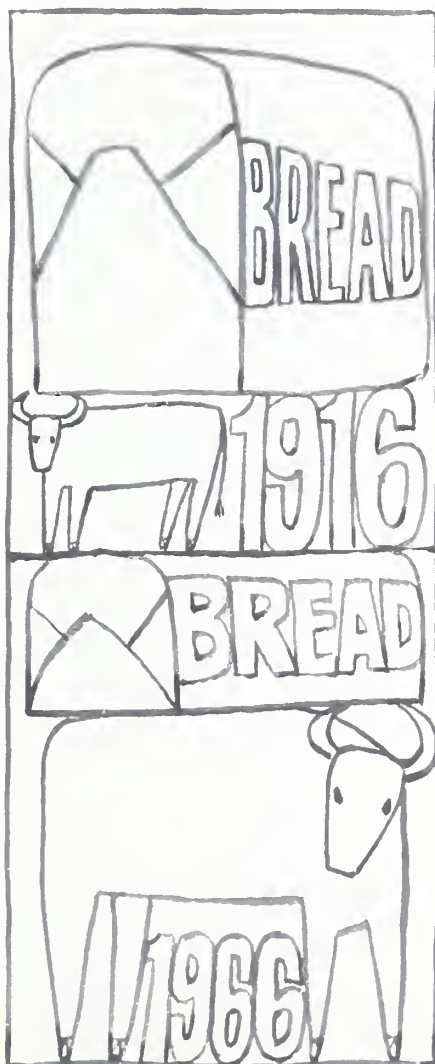
Given these factors, economists could determine how much wheat, rice, corn, sorghum, barley and other grains our farmers would likely produce by 1970 and by 1980—if the market price of each gave them an income equal to that earned in 1965.

With production thus projected, economists could then estimate how much wheat, rice and so on the U.S. would use and how much would be needed for commercial exports. What's left over becomes available for food aid and for necessary carryover stocks.

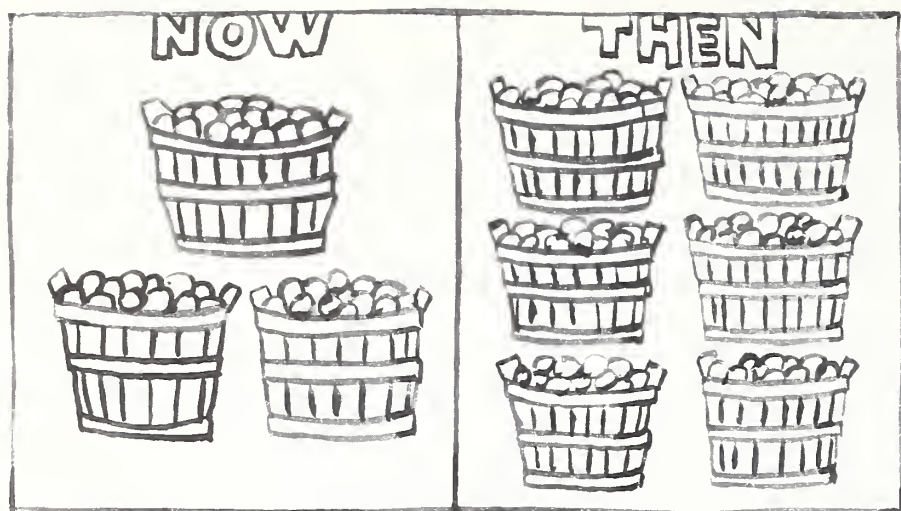
The future food aid needs of the developing countries were estimated assuming some improvement in diets but also that future rates of growth in production are about the same as the rates in the recent past.

Preliminary results show that the United States, on present cropland acreage, should be able to produce about *twice* the needs for food aid of the developing countries by 1970. But by 1980 their needs will be much higher.

The implication of the study is clear: Higher food output coupled possibly with planned population growth in the developing countries themselves are needed to eliminate or at least drastically reduce the need for food aid. The role of the United States and other developed nations here is to help provide the necessary technology, know-how and financial assistance.



COMMODITY ANALYSIS



OUTLOOK & PROJECTIONS

This is one of the studies conducted under the Division's responsibility to *appraise the long-run outlook for farm production and prices, to forecast the demand for farm products and to analyze food consumption trends.*

Essentially, this research area covers the broad spectrum of the national economy in order to assess the impact of change on agriculture.

For example, economists analyze the effect of income and excise tax cuts, changes in the federal budget, ups or downs in new home construction, stepped up or reduced capital outlays by heavy industry in new plant and equipment.

All these factors have a bearing on what happens in the agricultural economy. And with these pinned down, specialists can then answer many questions vital to farmers:

How fast will markets for U.S. farm products grow in the next few months? Next year? Five, 10 or 20 years hence?

Are farm prices likely to trend up or down? Which foods will people prefer in the years ahead? How much will the school lunch, food stamp and related distribution programs improve the nutrition of needy people and raise the nation's total use of

food?

Each answer, provided by ESAD, is the basis for a policy decision, whether by government, by the food industry or by the individual farmer.

The Economic and Statistical Analysis Division has three other major research responsibilities:

Commodity situation and outlook. U.S. farmers grow almost everything that will grow in a temperate climate, from rapeseed and popcorn to naval stores—rosin and turpentine. But the farm economy is largely built on such major commodities as wheat, corn, soybeans, cotton and livestock.

How large the crop, how stable or varied the price, how strong or weak the markets both here and abroad—such factors determine what income farmers get, what price consumers pay, what quantities of food and fiber we have available to sell abroad, what quantities we can ship abroad as aid.

All these factors, for this year, last year and years past, are constantly being analyzed in ESAD's commodity situation and outlook work. What emerges is a set of barometers sensitive to the many nuances of change in the nation's farm and general economy. These "situation" reports, some pub-

lished monthly, some quarterly, tell at a glance what the outlook is in coming months for each of the key commodities.

Economists working in this research area also seek answers for Congress and administration officials on the cost and probable success of new legislation to help one or more groups of farmers.

Take cotton producers, for instance. Cotton returns more money to farmers than any other U.S. farm product. But cotton in recent years has been up against stiff competition in this country from manmade fibers, in foreign markets from cotton grown in other exporting countries. When unsold cotton backs up in U.S.



FARM INCOME

warehouses, producers feel the pinch.

ESAD specialists recently calculated answers to a number of pertinent questions: What would happen to farm income if a new program reduced cotton acreage and production? What kind of government supports would be needed? What would be the short- and long-term impact on foreign sales? How could cotton better compete with synthetics?

Subsequently, Congress passed legislation designed to help solve economic problems for cotton farmers.

Farm income. Will farm income be up or down this year?



AGRICULTURAL HISTORY

The question rebounds throughout the rural economy and in urban centers, too. Bankers who serve farmers ask if times will be good. Farm machinery dealers wonder if farmers will be buying or only looking. And of course, farmers have the most direct interest in what price their crops will probably bring and what their net incomes will be.

The probable answers come from the Economic and Statistical Analysis Division. Four times a year, in the *Farm Income Situation*, ESAD estimates the cash receipts from farm marketings. This is done by month—by state—by commodity.

But marketings alone don't indicate actual income. Added to them must be government payments to farmers who sign up under one or another of the commodity programs, the value of home-grown foods used on farms and the rental value of farm dwellings. The total is gross farm income. Deducting from this the cost of things that farmers must buy to run their farms, economists are able to estimate net income.

Research on farm income also includes setting up formulas that show how agriculture affects jobs and income in other parts of the national economy. Say, for example, that ranchers produce a lot more cattle for slaughter this year. More cattle means more steel for fencing, more petroleum for the trucks to haul the animals to markets and, ultimately, more business for these nonfarm industries.

Agricultural history. Whatever the field of endeavor, we learn from past successes—and past mistakes. Agriculture is no exception, as members of Congress and others in government and industry recognize.

This fourth and last of ESAD's research areas looks back at the many-sided development of American agriculture in order to help planners look ahead.

How have our past farm support programs worked? What about the wheat program? To provide background for new policy decisions, ESAD historians have traced the major provisions and detailed variations in the government's price support programs for wheat enacted since the mid-1930s.

Historical research delves, too, into our foreign experience in agriculture through the years. One study follows the course of our technical assistance programs which began not after World War II, as is often thought, but shortly after Commodore Perry opened Japan to western commerce in the 1860s. The Japanese asked U.S. farm experts to help them colonize Hokkaido, their northernmost island. This was the start of an aid program which, as Division historians show, has contributed to farm progress throughout the world.

Finally, ESAD records the history of the Department of Agriculture itself. Its first hundred years were chronicled in *Century of Progress*, a book that was published to commemorate the Department's centennial celebration which took place in 1962.

Fundamentally, then, the task of the Economic and Statistical Analysis Division is to provide economic intelligence that enables American agriculture and government to make the best possible judgments about our future food needs and our ability to meet them.

Economic intelligence starts with numbers, thousands of them, on population, farm commodity prices, income, food production and consumption and a host of other indicators.

But numbers in themselves have little value. How they are interpreted by ESAD specialists is what turns them into meaningful intelligence.

Even in the nuclear—and computer—age it takes man to make statistics make sense.

This is ERS . . .

This is the seventh in a series of articles on the seven divisions that make up the Economic Research Service. The series highlights the research studies and findings that help to answer the perennial ifs in American agriculture.

NATURAL RESOURCE ECONOMICS

Drought in the Northeast. Floods in the Midwest. One million acres of land a year going into cities and highways. Soaring demands for outdoor recreation. A new urgency for pollution control and concern with natural beauty.

There's been a revolution in the last few years in the nation's thinking about how and when and why to develop and preserve our natural resources.

This thinking is now being translated into a dazzling array of new laws, new commissions and rural districts for the long-term conservation and use of our land and water. Studying the problems and the proposed programs to determine their impact on agriculture is a major task of ERS's Natural Resource Economics Division (NRED).

Take one example: In no section of the country is the water problem more acute or more complex than in the Pacific-Southwest Region. This vast region takes in southern California, Nevada, Utah, Arizona and parts of other states.

This is a region of fast growing cities and booming industry. Both draw heavily on the surface and ground water needed for agricultural use. Much of the region gets its water from the Colorado River. But the Colorado, like other rivers and streams in the area, is declining in quality with the increase of salt, sediment and other pollutants.

The problem shows up in the courts, in conflict between states and in disputes between the United States and its neighbors.

How is it to be solved? And at what cost? By importing water from the Pacific-Northwest? By even more ambitious and complicated schemes to import water from Canada and Alaska? By costly processes to take the salt out of sea water?

In the absence of such costly developments, economic growth in the region may be thwarted. There will be less water to pro-

California or Arizona? Would the production capacity of the nation be adequate to satisfy the long-term demand for food and fiber? If so, what would be the economic cost?

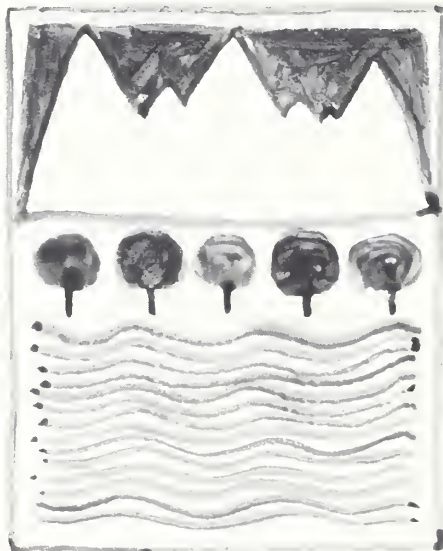
One of the main responsibilities for the Division specialists is to develop long-range economic projections that will bear on these problems. They also appraise the nature and extent and economic effects of drought, flood, poor land drainage, land erosion and sedimentation in the water itself.

Finally, NRED specialists assess the economic effects on agriculture of alternative policies. Such greater awareness also demands more sophisticated tools of analysis to guide the investor—both public and private—as he commits himself to future investment. Along with the national policies and the analytical tools, the local and regional economies need more effective institutions, institutions better structured to manage our natural resources.

To meet these needs for further information on the nation's resources, the Division works in five general areas.

River basin planning. Agriculture is the No. 1 user of land and water. The amount of water available to cities, to industry and to recreational uses depends directly on the way farm and forest interests make use of our watersheds. Equally, the *quality* of our water supply depends on the land manager.

Thus, the nation's water supply for today and tomorrow in good measure flows—both literally and figuratively—from the farm. And



LAND RESOURCES

duce the citrus, vegetable and other farm products grown in the area.

What would be the economic consequences if the area's growth were to be curbed in such a fashion? What would be the impact on established firms and communities? What would the agricultural adjustments be in other regions in cotton and citrus production to offset the loss in

any national plan to develop our water resources must first determine how best to use the water going into farming and other rural uses.

The Division's projections for the Ohio River Basin—as it will look in 1980 and in the year 2010—typify some of the work in this area.

As the work already completed shows, agriculture in the Ohio area will enjoy a large surplus of land and water in 1980. By the year 2010, however, needed output may require substantial amounts of high-cost marginal lands for crop and pasture use. As such land is brought into production, the region will have an increasing

development.

Watershed program analysis. Smaller than the major river basins but equally important to the nation are the watersheds fed by secondary rivers and streams. More than 8,000 small watersheds have been tagged as needing flood and erosion control, soil conservation and similar attention.

NRED economists have two research responsibilities in this area. The first requires special studies of special problems: analysis of flood damages in small watersheds, benefits and costs of recreation development, local secondary effects of watershed development projects and socioeconomic factors of watershed organizations.

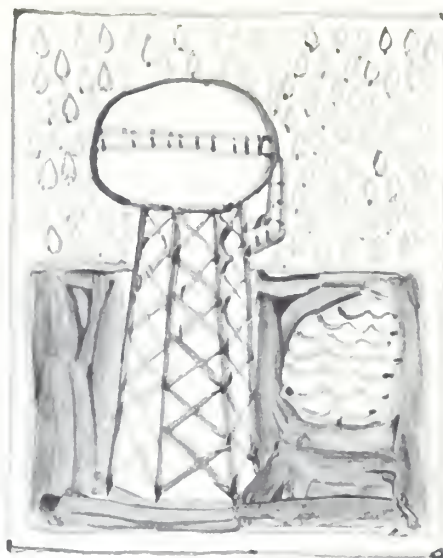
For example, how extensive was recent flood damage in the Upper Rio Hondo watershed of New Mexico? How much would it cost to develop a watershed for recreational use and how much would farmers gain?

Research on the local secondary effects of watershed development seeks answers to such questions as this: If farm operators get a better income as a result of a watershed program, how much will they pass along to the local community? One study showed that for every \$54,362 spent locally by farmers, service stations get \$2,883; grain elevators, \$2,244; doctors, \$1,142; department stores, \$483 and so on.

The second Division responsibility in this research area is to evaluate how well watershed projects work once they are completed. What worked well or poorly in one watershed may help to guide planners in developing another.

For instance, one study showed that farmers and other residents in the Honey Creek watershed of Iowa save over \$20,000 a year, thanks to a program in the late 1950s that has reduced flooding, saved roads and bridges, cut sedimentation damage and intensified land use.

Water quality. Much water pol-



WATER RESOURCES

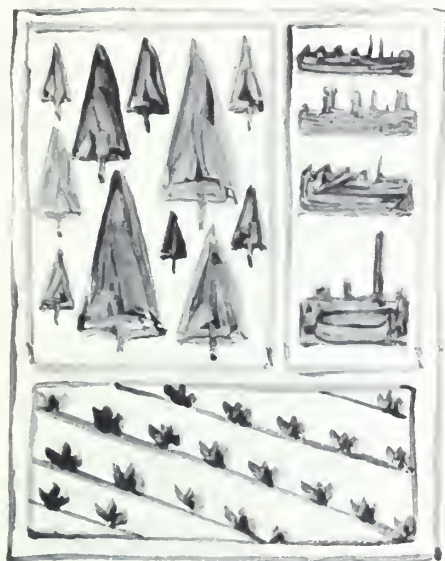
lution is caused by industrial wastes dumped into rivers and streams. But part of it originates on farms due to soil erosion, animal wastes and chemical residues of fertilizer and pesticides.

Water rights. In today's complex society, there are constant, often conflicting demands for water for agriculture, for industry and for our fast growing cities and towns.

All states have water rights laws, overlaid by court-made rules and varying interpretations by local governments. To help water users and government planners alike in determining just who has what water rights where, NRED specialists are compiling the water rights laws of 17 western states and Hawaii in one study, as well as the laws of 31 eastern states in another study. The reports will comprise the first national overview of the water rights laws of the separate states.

In addition to its extensive water research program, the Division is concerned with more effective use of our land resources.

Land utilization. The United States, counting Hawaii and Alaska, has some 2.3 billion acres of land, plus 43 million acres in lakes and streams. Thus our land supply is fixed—but our needs for



RESOURCES INSTITUTIONS

need for drainage and flood control, especially toward the end of the period. There will also be mounting need for irrigation development as the years go by, especially for the production of vegetables and other high-value specialty crops.

The results of such studies are combined with the work of other agencies on the problems of pollution, flood control, navigation and the like. Together, they provide the basis for a comprehensive appraisal of long-range needs for

food and fiber and forest keep changing.

NRED's task in this research area is to trace and explain the changes in how we do use our fixed supply of land and to explore more effective ways of managing this vital resource.

For instance, inventories show that 20 per cent of our land area is cultivated cropland, 28 per cent is grassland pasture and range. Another 34 per cent is forest and the remaining 18 per cent is in nonagricultural uses.

Moreover, the research shows that there have been major shifts in land use over the last three decades. An example: 30 million acres or more of poor cropland have been diverted to forest and pasture; concurrently, some 10 million acres of new land have been brought into cultivation.

Land tenure and income distribution. Farm management is getting more complex, what with the rise of farm corporations, land contracts, part-ownership and vertical integration, the latter an arrangement whereby the farmer grows-to-order for a predetermined buyer.

Land tenure research delves into the changes in the way land is held and used as a result of these new ways of doing business.

One such study of rural land ownership in the Southeast shows the number, size and use of individual land holdings, along with the changes in the use of land. An offshoot of this study provided a profile of white and Negro landowners in the region. It showed that Negro owners are older on the average than whites. They first acquire land at an older age, have a lower rate of transfer than whites and rely more on inheritance to get their land.

Tenure arrangements also affect the income of farmers. A recent Division analysis showed that the price support program for flue-cured tobacco in North Carolina tended to benefit landowners more than tenant farmers. Re-

turns to labor, and thus income to tenants, went up at only one half the rate at which returns to land, and consequently the owner's income, increased.

Rural zoning and other land use controls. All states, over 400 counties and nearly 1,700 towns or townships have zoning ordinances. For instance, there are zoning districts in California to reserve the best farmland solely for farming; even nonfarm rural residences are excluded.

Some states have special districts to conserve forests or water resources or soil. Some have districts to promote camping and other recreation.

Studying the special districts



ENVIRONMENTAL ECONOMICS

and zoning methods already in operation, NRED is able to assess the potential for using such methods to aid economic development in, say, Appalachia, a region where poverty is of national concern.

NRED also studies the problems that farmers face as cities move ever farther into the countryside. Land values go up, but so do farm taxes as subdivisions of new homes spring up on all sides.

Greenbelts are one device used to aid farmers. Greenbelt zoning

requires that individual land holdings in an area be large enough to run an efficient farm. This rules out buying up land for individual home sites and most subdivisions.

However, Division studies conclude that greenbelts, as well as tax easements for farmers, are at best a delaying tactic in most parts of the country. Citizens on the urban-rural fringe of Los Angeles, for instance, showed little interest when surveyed on the purchase of land with public funds to protect open space. They felt it would cost too much and in the end would go under the bulldozer for homesites anyway.

Outdoor recreation. Our nation of city dwellers is turning rapidly to outdoor vacations and the need for more recreation facilities is expanding even faster than the population.

This gives many farmers the chance to develop a new source of income. NRED studies show that on-farm recreation can pay off. The key is sound management.

Another study of farm vacations in Ohio suggests that there are opportunities here for farmers and their wives who like people and will cater to the public.

A vacation home on mountain or lake is another dream of many people who live and work in the city. NRED research indicates they should choose their cabin site carefully. A cluster of new vacation homes may be more than the public services of a rural county can handle. A study of one such area in the Blue Ridge Mountains of Virginia suggests that problems may arise in getting adequate water, sewage and garbage disposal, road maintenance and police protection.

In conclusion then, the Natural Resource Economics Division studies the economics underlying the use, past and present, of all our land and water resources. The Division's purpose is to provide analysis and guidelines to help the nation make better use of these resources in coming years.

